

National Aeronautics and Space Administration



NASA Space Biology Plant Research for 2010-2020

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*39th ISLSWG Meeting
Freiburg Germany
August 1, 2012*

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The U.S. National Research Council (NRC) recently published “Recapturing a Future for Space Exploration: Life and Physical Sciences Research for a New Era” (http://www.nap.edu/catalog.php?record_id=13048), and NASA completed a Space Biology Science Plan to develop a strategy for implementing its recommendations (http://www.nasa.gov/exploration/library/esmd_documents.html). The most important recommendations of the NRC report on plant biology in space were that NASA should: (1) investigate the roles of microbial-plant systems in long-term bioregenerative life support systems, and (2) establish a robust spaceflight program of research analyzing plant growth and physiological responses to the multiple stimuli encountered in spaceflight environments. These efforts should take advantage of recently emerged analytical technologies (genomics, transcriptomics, proteomics, metabolomics) and apply modern cellular and molecular approaches in the development of a vigorous flight-based and ground-based research program.

This talk will describe NASA’s strategy and plans for implementing these NRC Plant Space Biology recommendations. New research capabilities for Plant Biology, optimized by providing state-of-the-art automated technology and analytical techniques to maximize scientific return, will be described. Flight experiments will use the most appropriate platform to achieve science results (*e.g.*, ISS, free flyers, sub-orbital flights) and NASA will work closely with its international partners and other U.S. agencies to achieve its objectives. One of NASA’s highest priorities in Space Biology is the development research capabilities for use on the International Space Station and other flight platforms for studying multiple generations of large plants. NASA will issue recurring NASA Research Announcements (NRAs) that include a rapid turn-around model to more fully engage the biology community in designing experiments to respond to the NRC recommendations. In doing so, NASA’s Space Biology research will optimize ISS research utilization, develop and demonstrate technology and hardware that will enable new science, and contribute to the base of fundamental knowledge that will facilitate development of new tools for human space exploration and Earth applications. By taking these steps, NASA will energize the Space Biology user community and advance our knowledge of the effect of the space flight environment on living systems.